Fourier Series, Period $2L$	$f(x) = a_0 + \sum_{n=1}^{\infty} \left[a_n \cos\left(n\frac{\pi x}{L}\right) + b_n \sin\left(n\frac{\pi x}{L}\right)\right]$
$a_0 = \frac{1}{2L}\int_{-L}^{L} f(x)\ dx, \quad a_n = \frac{1}{L}\int_{-L}^{L} f(x)\cos\left(n\frac{\pi x}{L}\right)\ dx, \quad b_n = \frac{1}{L}\int_{-L}^{L} f(x)\sin\left(n\frac{\pi x}{L}\right)\ dx.$	

Fourier transform of $f(x)$:	$\mathcal{F}[f(x)](k) = \hat{f}(k) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} f(x)e^{-ikx}\ dx.$
Laplace transform of $f(t)$:	$\mathcal{L}[f(t)](s) = F(s) = \int_{0}^{\infty} f(t)e^{-st}\ ds.$

$f(x)$	$\mathcal{F}[f(x)](k) = \hat{f}\,(k)$
e^{-ax^2}	$\frac{1}{\sqrt{2a}}e^{-k^2/(4a)}$
$e^{ax}H\,(x)$	$\frac{1}{\sqrt{2\pi}(a+ik)}$

Formula	Name
$\mathcal{F}[f'\,(x)] = (ik)\,\hat{f}(k)$	Differentiation
$\mathcal{F}[f * g] = \sqrt{2\pi}\ \hat{f}\,(k)\,\hat{g}\,(k)$	Convolution Th.

$f(t)$	$\mathcal{L}[f(t)](s) = F\,(s)$
1	$\frac{1}{s}$
t^n	$\frac{n!}{s^{n+1}}$
e^{at}	$\frac{1}{s-a}$
$\cos(\omega t)$	$\frac{s}{s^2+\omega^2}$
$\sin(\omega t)$	$\frac{\omega}{s^2+\omega^2}$
$\delta(t-a)$	e^{-as}
$H(t-a)$	$\frac{e^{-as}}{s}$

Formula	Name
$\mathcal{L}[e^{at}f(t)] = F(s-a)$	s – shifting
$\mathcal{L}[f'\,(t)] = sF(s) - f(0)$	Differentiation
$\mathcal{L}[f(t-a)H(t-a)] = e^{-as}F(s)$	t – shifting
$\mathcal{L}[tf(t)] = -F'(s)$	Differentiation of F